the "lime light" is so pure and intense, that all common flames placed in its rays are thrown as dark *shadows* upon surrounding objects.

If a given weight of lime be placed in a glazed earthen plate, and set under shelter from rain, yet freely exposed to the air for a few days, and then replaced in the balance, it will manifest a considerable increase of weight; and if it be afterwards transferred into a clean dry Florence flask, and then its bulb gently heated over the flame of a lamp, an appearance like dew will be observed in the upper part, or neck, of the flask: the theory of this experiment is readily explained.

Even in the driest weather the air contains the vapour of water, and for it, lime has a strong chemical attraction, consequently, increases in weight by exposure; then upon subsequently heating the lime the water vaporizes and condenses into the liquid form within the upper, and colder part, of the flask.

If the lime be exposed to the air for many days it will increase in weight from another cause,—this will demand future attention,—but the above simple experimental fact of the absorption of water, points out to the architect and builder the necessity of placing lime in perfectly closed vessels, if it be required to remain as "*quick*-lime."

If the bulb of a mercurial thermometer having a long range of scale or graduated to 620 degrees be thrust into a heap of quicklime, it will indicate a certain temperature which for the sake of example may be 60 degrees; if the instrument be removed, its bulb carefully wiped and then plunged into a bucket full of water, it will indicate the same temperature. Let the water be suddenly thrown upon the lime, which will rapidly imbibe it by capillary attraction, and then in the course of a few seconds the individual lumps of lime will swell, crack, and crumble asunder, whilst a copious volume of vapour arises from the *slaking heap*, and now upon thrusting in the bulb of the thermometer, it will probably indicate a temperature not far below 500 degrees. The operation of "slaking lime" is so very common, that it rarely excites attention, but its close examination by the chemist reveals an extremely curious and important fact.

Why should two substances of the same moderate temperature, or familiarly speaking, *cold* become *hot* when mixed together?

Many practical men, if they happen to condescend an answer to such an apparently simple or trivial question, will say, "because the lime has been well burnt, and has plenty of fire in it." But this will not satisfy a chemist, and it is only after a variety of accurate experiments that he can give a true explanation of the phenomenon, for it is a phenomenon, although the term may be deemed too grandiloquent when applied to such an everyday occurrence. Divested as far as possible of technicalities, the explanation runs thus:—Water in its ordinary liquid state contains a certain amount of heat, which being inappreciable by the thermometer, is called *latent heat*, and when water changes from the liquid to the *solid* state, as, for example, in freezing, this *latent heat* being no longer required to maintain the new physical state of *ice*, is therefore expelled, or becomes *sensible heat*.

When water is suddenly thrown upon lime, its immediate disappearance within the lumps of lime is due to an attraction purely mechanical, or the capillary attraction of their pores. The two substances being thus brought into close contact, then chemical attraction or affinity commences between them, and during their combination the lime actually *solidifies* the water, whose *latent heat* of original liquidity being no longer required, escapes as *sensible heat*, which even raises a certain portion of the water in the form of vapour, or steam.

The lime thus *slaked* or *hydrated* is materially increased in bulk and weight, but feels perfectly *dry*, for the water is only *solidified* by being deprived of heat, it is *not decomposed*, and if a portion of this slaked lime be heated in a flask as already directed, the chemical affinity between the two substances will be overcome, the solid water will gain heat to assume the *liquid* state, this will gain more heat to assume the *vaporous* state and ascend to the upper part of the flask, which being cold, will deprive the vapour of part of its heat or condense it into the state of liquid water containing a definite amount of *latent heat*, and if this liquid water be again solidified the *latent heat* will be expelled as *sensible heat*.

All practical men are aware that it is rather dangerous to slake large quantities of lime near wooden sheds, stacks of timber, or heaps of shavings, for the evolved heat may become sufficiently intense to cause the inflammation of these combustible materials, and if the lime be extremely "quick" it is occasionally dangerous to stand near the slaking heap, for the rising steam carries up an acrid dust of lime which is extremely irritating to the lungs, whilst very frequently particles of lime are violently projected from the expansive force of the steam within the heap: such particles striking the eye might deprive it of sight, not only by mechanical force, but by chemical action on the cornea, for lime exerts a caustic or corroding power upon most organic bodies.

The heat evolved during the slaking of lime in closed iron cylinders, has been proposed and even introduced for warming apartments and cooking food, but very little can be said in praise of such *calcareous* warmth and *al fresco* cookery.

The addition of more water to lime than is absolutely essential to the formation of its definite *hydrate*, produces a semi-fluid, practically known as *cream* or *milk of lime*. This chiefly consists of lime in a state of mechanical suspension throughout the water, and upon leaving such mixture at rest for a short time, the lime will precipitate to the bottom of the vessel in which the experiment is conducted, whilst a perfectly transparent, colourless liquid, will occupy the upper part. This liquid is not pure water, but an aqueous solution of lime, commonly called *lime-water*, and although containing only a very small quantity of lime, it exerts a powerful alkaline action upon the generality of organic matters, and there is a very curious chemical fact, presented during the formation of "lime-water," namely, that the *colder* the water the *more* lime will it actually dissolve: thus water at 33 degrees, or near the freezing point, will dissolve exactly twice as much lime as water will do at 212 degrees, or its ordinary boiling point.

Lime-water for experimental purposes is always formed and kept in green-glass bottles accurately stoppered, and it will remain transparent and colourless as water. Let a portion of it, say a quarter of a pint, be decanted into a perfectly clean and dry Florence flask the neck of which must then be closed by a perfectly clean cork, having a slit or groove cut from its upper to its lower part, large enough for a small crow-quill to pass through; fold a strip of woollen cloth four or five times around the neck of the flask, to form a non-conducting handle, by which it may be held over the flame of a spirit or argand lamp; or suspend it in such position by a wire, without the cloth if more convenient; allow the bulb of the flask to warm gradually, the lime-water will soon boil, steam will rapidly escape through the groove in the cork, and the originally transparent colourless lime-water will become milk-white from the deposition of lime, thus illustrating the fact of that substance being less soluble in hot than in cold water.

Reference will be made, in the course of a few more paragraphs, to lime-water, and a change that it undergoes without the application of heat; therefore the uses of "cream of lime," which consists of mechanically suspended and chemically dissolved lime, may be now detailed. When "cream of lime" is kept of an uniform degree of semi-fluidity by constant stirring or "rousing," it is an invaluable "wash" for old walls, as, on account of its causticity, it effectually dissolves, or destroys, all organic filth that may be adherent to them; at the same time a peculiar odour, somewhat resembling that of impure "hartshorn," is very frequently exhaled from the walls thus "lime whited." Old walls, especially of stabling, contain a large proportion of ammoniacal compounds. *Ammonia* consists of nitrogen and hydrogen gases; organic matters, especially those of the animal kingdom, contain the same gases, generally in addition to oxygen gas, and the element carbon.

When organic matters, so constituted, run into putrefaction, a portion of the nitrogen and hydrogen assume new affinity, and produce *ammonia*, at the same time a portion of the oxygen and carbon produce *carbonic acid*; these newly formed compounds then unite to produce *carbonate of ammonia*, or "volatile salt," which the walls receive; and when they are lime-whited, the lime, by its superior affinity for the carbonic acid, unites with it to produce *carbonate of lime*, whilst the ammonia is expelled as a pungent vapour, having the odour of "hartshorn," because it is actually existent in that well-known stimulant. For the cream of lime to be active in destroying organic filth, and decomposing ammoniacal compounds, it must be formed of *quick-lime*, and applied to the walls immediately. One simple test of its fitness is to place a slice of the yellow turmeric root in a portion of it: the yellow should become reddish brown. Another, and a better test, is to pour a wine-glass full of the "cream of lime" into an ale glass containing half a fluid ounce of "spirit of salt" (hydrochloric acid), diluted with an equal quantity of water; and if no effervescence, like that produced by "soda-water powders," appear, the cream of lime may be deemed fit for use. Generally speaking, workmen are extremely reluctant in applying "lime white" to walls, because it corrodes their brushes (this is a test of its goodness); and for it they will gladly substitute "white-wash." This dries beautifully white, certainly; but old walls, so treated, must be regarded as mere "whited walls, or whited sepulchres," their filth being merely hidden, and not destroyed, by the purity of their coating; because "white-wash" is made of *carbonate of lime*, or *whiting*,—a neutral compound, having no causticity.

In addition to oxygen and nitrogen gases, carbonic acid is invariably present throughout the atmosphere. Now lime, either hydrated, diffused, or dissolved in water, has a strong attraction for carbonic acid, and will soon change into carbonate of lime; this is the cause of the increase of weight, as already noticed, that lime acquires after a protracted exposure to the atmosphere, the first action being its conversion into hydrate, by the absorption of watery vapour, the second action being the combination of the lime of such hydrate, with carbonic acid, to form *carbonate of lime*.

This is also the reason that quick lime, cream of lime, and lime water, all require to be kept out of the contact of air, or they will soon become carbonated, and then instead of remaining or quietly dissolving in dilute hydrochloric acid, they will effervesce, like "soda-water" from the expulsion of the *carbonic acid*. The thin white pellicle or film that forms upon the surface of lime water or cream of lime, when exposed to the air, announces the transition of the caustic lime into the inert carbonate.

CURRENT COMPETITIONS.

We have received information from parties in whom we have confidence, that the invitation to compete for the fever hospital at Bedford is a mere cloak, a London architect having sent in plans and estimates for it, which have been approved by *most* of the committee.

We shall be glad to find that our informants are in error: the result will shew. If, unhappily, the statement be correct, the committee shall hear from us.

Relative to the Army and Navy Club-house competition, several correspondents have directed our attention to a plan which has been circulated of the site of the intended new edifice, on which is marked certain dimensions of "limited" and "unlimited heights," having reference to "rights of light." One says:—"The law on the subject we all know is quite undefined, but in reference to the particular building in question, it may so happen, that from local knowledge, or other means, certain parties may be more in the secret of these rights than the majority of their architectural brethren; allow me therefore to suggest through the medium of your paper, that in the present case, and in others of a like nature, the Institute of Architects should appoint some surveyor to prepare a proper plan, with all particulars in reference to the site of such intended new building, and have the same lithographed for distribution among its members. The successful architect to reimburse the Institute for the cost of the plan."

We should be sorry to see the Institute engaged on any such profitless work. As to the lights, competitors must use their own judgment; the committee, by drawing attention to them, have done perhaps as much as could be expected from them. In connection with

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